

Appl. No. 10/772,064
Amdt. dated July 20, 2006
Reply to Office Action of April 21, 2006

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1. (currently amended) A method for making a semiconductor package comprising:

(a) molding a molding material around a leadframe structure having a die attach region and a plurality of leads, wherein a window and an exterior surface are formed in the molded molding material after molding, and wherein the die attach region is exposed through [[a]] the window in the molding material; and

(b) after (a), mounting a semiconductor die having a surface with an electrical terminal to the die attach region and within the window using a flip chip mounting process, wherein after mounting, the leads have surfaces that are substantially coplanar with the exterior surface of the molding material and the surface of the die with the electrical terminal, and wherein the surface of the die with the electrical terminal is exposed by the window in the molding material.

Claim 2. (previously presented) A method for making a semiconductor package comprising:

(a) molding a molding material around a leadframe structure having a die attach region and a plurality of leads, wherein the die attach region is exposed through a window in the molding material; and

(b) after (a), mounting a semiconductor die to the die attach region using a flip chip mounting process, wherein the semiconductor die comprises a vertical power MOSFET.

Claim 3. (previously presented) A method for making a semiconductor package comprising:

Appl. No. 10/772,064
Amdt. dated July 20, 2006
Reply to Office Action of April 21, 2006

PATENT

(a) molding a molding material around a leadframe structure having a die attach region and a plurality of leads, wherein the die attach region is exposed through a window in the molding material; and

(b) after (a), mounting a semiconductor die to the die attach region using a flip chip mounting process, wherein the plurality of leads include at least one source lead and at least one gate lead.

Claim 4. (original) The method of claim 1 further comprising, after (b):
reflowing solder that is between the die attach region of the leadframe and the semiconductor die.

Claim 5. (original) The method of claim 1 wherein the die attach region comprises at least one aperture.

Claim 6. (original) The method of claim 1 wherein molding comprises placing the leadframe structure in a molding tool.

Claim 7. (original) The method of claim 1 further comprising depositing solder on the die attach region of the leadframe structure and within the window.

Claim 8. (original) The method of claim 1 wherein the plurality of leads comprises a source lead and a gate lead.

Claim 9. (original) The method of claim 1 further comprising:
attaching a heat plate structure to the leadframe structure.

Claims 10.-20. (canceled).

Appl. No. 10/772,064
Amdt. dated July 20, 2006
Reply to Office Action of April 21, 2006

PATENT

Claim 21. (previously presented) The method of claim 2 wherein the die attach region comprises at least one aperture

Claim 22. (previously presented) The method of claim 3 wherein the die attach region comprises at least one aperture.

Claim 23. (currently amended) The method of claim 1 wherein ~~a bottom surface of the die is substantially coplanar with a surface of the molding material~~ the electrical terminal is a drain terminal.

Claim 24. (canceled).

Claim 25. (currently amended) The method of claim 1 further comprising depositing a first solder on the die attach region, and depositing a second solder on the die.

Claim 26. (currently amended) The method of claim 1, wherein the die comprises a vertical power MOSFET including a trenched gate ~~after mounting, the die package is formed, and wherein an exposed backside of the die forms an electrical terminal.~~

Claim 27. (new) The method of claim 1 wherein the window is a first window and wherein a second window is formed in the molding material after molding, wherein the second window exposes a surface of the leadframe structure opposite to the die attach surface.

Claim 28. (new) The method of claim 27 further comprising attaching a heat plate structure to the surface of the leadframe structure that is exposed through the second window.

Claim 29. (new) The method of claim 28 wherein the heat plate structure comprises a leg that extends over a side of the molding material.

Appl. No. 10/772,064
Amdt. dated July 20, 2006
Reply to Office Action of April 21, 2006

PATENT

Claim 30. (new) The method of claim 1 wherein after (b), a package is formed, and wherein the method further comprises:

mounting the package on a circuit substrate, wherein the surface of the die with the electrical terminal, the exterior surface of the molding material, and the surfaces of the leads are proximate to a surface of the circuit substrate.

Claim 31. (new) The method of claim 30 wherein the electrical terminal is a drain terminal in a power MOSFET in the semiconductor die.